

Amendments to the Claims

1. A biological water or wastewater treatment process comprising:
passing the water or wastewater into at least one biological tank, wherein the biological tank includes at least one free or mixed biomass;
performing at least one separation step on the water or wastewater in the biological tank to generate sludge and treated effluent;
measuring a nitrate content of the treated effluent or the water or wastewater;
measuring a redox potential of the water or wastewater in the biological tank;
aerating the water or wastewater in the biological tank until either
 - (1) an elapsed aeration time exceeds a minimum aeration time and the measured nitrate exceeds a high nitrate set value or the measured redox exceeds a high redox set value; or
 - (2) the elapsed aeration time exceeds a maximum aeration time and the measured nitrate is less than or equal to the high nitrate set value or the measured redox is less than or equal to the high redox set value; andsubjecting the water or wastewater in the biological tank to anoxic treatment until either
 - (1) an elapsed anoxic treatment time exceeds a minimum anoxic treatment time and the measured nitrate is less than or equal to a low nitrate set value; or
 - (2) the elapsed anoxic treatment time exceeds a maximum anoxic treatment time and the measured nitrate exceeds the low nitrate set value.
2. The biological water or wastewater treatment process of claim 1 wherein aerating the water or wastewater further includes aerating the water or wastewater in the biological tank until the elapsed aeration time exceeds the minimum aeration time and the measured nitrate

exceeds a very high nitrate set value or the measured redox exceeds a very high redox set value.

3. The biological water or wastewater treatment process of claim 1 further comprising measuring a slope corresponding to a variation of the measured redox potential with respect to a time period and regulating air flow into the tank while aerating the water or wastewater to generally maintain the measured slope at a preset value.

4. The biological water or wastewater treatment process of claim 1 wherein the separation step comprises a settlement step.

5. The biological water or wastewater treatment process of claim 1 wherein the separation step comprises a filtration step using at least one filtration membrane.

6. The biological water or wastewater treatment process of claim 5 wherein the filtration step comprises passing the water or wastewater from the biological tank in at least one external filtration loop, wherein the external filtration loop includes at least one immersed or pressurized filtration membrane.

7. The biological water or wastewater treatment process of claim 5 wherein the filtration step comprises filtering the water or wastewater in the biological tank through at least one filtration membrane immersed in the biological tank.

8. The biological water or wastewater treatment process of claim 7 further comprising aerating the immersed filtration membrane to prevent clogging or to unclog the membrane.

9. The biological water or wastewater treatment process of claim 1 further comprising regulating an air flow used to aerate the immersed filtration membrane as a function of the flow of the water or wastewater through the filtration membrane.

10. The biological water or wastewater treatment process of claim 1 further comprising regulating air flow into the tank while aerating the water or wastewater to maintain a generally fixed rate of change of the redox potential over a predetermined time period.